and the author has succeeded in bringing together a mass of useful information and presenting it in an interesting form to the reader. A valuable feature in so new a subject is that full references are given for all the data, and at the end there is a bibliography. E. J. R.

MATTER AND THE STRUCTURE OF THE ETHER.

The Universe and the Atom. By M. Erwin. Pp. 314. (London: Constable and Co., Ltd., 1915.) Price 8*s.* 6*d.* net.

THIS work is divided into two parts, the first being devoted to a general discussion of wave motion, and the second to a special theory as to the structure of the ether and its consequences. The theory called "the pan-cycle hypothesis" deals with "invisible composition light waves, the warp and woof of the ether structure and of all things material."

In spite of some inaccuracies, the first part contains quite an interesting account of the nature of wave motion, although the long and frequent quotations from other text-books make the style somewhat disjointed. In some places too much stress is laid on the obvious, which indeed at times is so over-elaborated as to lead to absurdities. It is worth quoting one such passage, for the deductions drawn are used later to explain the theory of the mechanical structure of the ether. "Thus if a force of 5 units is operating in one direction, and another force of 3 units is operating on the same particle in the opposite direction, we say they are equivalent to a force of $5-3=2$ units of force operating in the first direction. We mean by that the particle would move from its first position, in the direction impelled by the greater force, and behave as if it were acted on only by a force of 2 units. This is all that composition of force gives us, but it does not speak the full event. It makes 3 of the greater units of force annihilate the 3 units of force operating in the opposite direction. Now force represents energy, and energy is never destroyed" (p. 74).

The second part deals with a new theory of ether structure, the nature of electrons, atomic theories, gravitation, and other fundamental questions based on a conception of the ether organised by so-called "force rays" resulting from trains of waves proceeding in different directions through the ether and producing stationary waves. The ideas involved do not seem very helpful in throwing light on these fundamental questions, and in many cases there is a marked lack of adequate discussion of existing theories. Thus the modern attempts to explain the Balmer series is dismissed with the following short paragraph:—"This formula by Balmer was derived entirely by trial from the observed wave lengths of the first fifteen lines of the hydrogen series. It has so far been regarded as entirely an empirical formula which expresses a fact, without anyone being able to state why the relation expressed by the formula should exist" (p. 102). The recent work of Bohr and others in this field might at least have been mentioned. Even facts are sometimes misstated, as will be seen from the two following passages: "The amplitude of some rays, such as X-rays, goes down to the infinitesimal" (p. 84); and ". . . gravitation itself has its limitations, in respect of the distance through which it can effectively operate, and its power is also affected by the internal heat or temperature of the body" (p. 125). Many of the fundamental conceptions in the theory are at fault, and these insecure foundations cannot support the elaborate superstructure built upon them.

FLOTATION OF ORES.

(1) *Concentrating Ores by Flotation.* By T. J. Hoover. Pp. vi+320. Third edition. (London: *The Mining Magazine,* 1916.) Price 12*s.* 6*d.* net.

(2) *The Flotation Process.* Compiled and edited by T. A. Rickard. Pp. 364. (San Francisco: *Mining and Scientific Press,* 1916.) Price 8*s.* 6*d.* net.

THE subject treated in these two books is one of great and rapidly increasing importance. The practical application of flotation methods is only about thirteen years old, and already the quantity of ore treated by them must amount to little, if any, less than 30,000,000 tons. When it is borne in mind that a large proportion of this quantity consists of slimes and complex ores that had defied all known methods of treatment until flotation processes were introduced, the economic importance of the subject can be readily appreciated. Furthermore, as Mr. Hoover points out in his book, this method is still in some respects in its experimental stage, and its limits of applicability are being rapidly widened, so that there are very good grounds for the opinion expressed by him:—"It would seem at the present time a justifiable prophecy that flotation methods of concentration will in the not distant future very largely displace gravity methods."

(1) The mere fact that the third edition of Mr. Hoover's work has been called for within four years of the appearance of the first edition is sufficient testimony to the value attached to it by the mining profession. It has from the first been accepted, and still remains to-day the standard work on the concentration of minerals by flotation methods.

As regards this third edition now before us, this has simply been produced by reprinting the second edition just as it was, without even attempting to correct any mistakes, but merely with the addition of a new chapter, so as to bring it up to date. It is difficult to justify such a method, seeing that some of the mistakes that have been allowed to stand are really serious. Thus it comes as a severe shock to find that Mr. Hoover should not only have written, but have allowed to remain, such a wholly indefensible chemical equation as "$KCy+Au=KAuCy$"; or to find him stating that "the horizontal surface of a liquid at rest" may be considered "the limiting surface of a bubble of infinite radius,"

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whereas it is really a portion of what is practically a sphere, with radius equal to its distance from the earth's centre, and hence quite definite.

Advantage should have been taken of a new edition to correct such mistakes, but, even as it is, Mr. Hoover's work still remains the authoritative text-book on this subject. Like all text-books dealing with a branch of technology in active development, it suffers from the fact that it falls behind the times even whilst it is passing through the press, but this is a disadvantage that the writer of such books must make up his mind to endure. His chief consolation is that it is the production of such books which contributes as much as anything else to the rapid advance of the art that leaves the written page behind.

(2) With true journalistic instinct Mr. Rickard has produced his book on "The Flotation Process" at a moment when this method is attracting a very large share of attention from the mining profession; the book cannot, however, be said to form a contribution of any real value to the literature of the subject, seeing that it is a typical example of a form of book-making that appears to be in some favour on the other side of the Atlantic, though fortunately not in this country. It consists of a series of miscellaneous articles on the subject of flotation by a number of different writers, gathered from various sources, though all have appeared already in the pages of the *Mining and Scientific Press*; these have been strung together on no particular system, forming just such a scrap-book as anyone interested in flotation might put together for himself—very useful, no doubt, to the man who had compiled it for his own purpose, far less so to anyone else, and practically useless to the student who demands a systematic presentment of the subject. The articles vary in length from a few lines to many pages, and are as unequal in value as they are in extent. The best article in the book is probably Mr. Rickard's own introductory chapter, which is itself a paper presented at a meeting of the Canadian Mining Institute.

Whilst Mr. Hoover's book can be recommended to the student who wishes to know what the various flotation processes are, how they are carried out, and what results are obtained by them, Mr. Rickard's compilation gives information on none of these points, but exhibits the different and often widely divergent opinions of a number of writers who approach the subject of flotation from very varied points of view, and most of which possess little more than an ephemeral interest.

H. L.

OUR BOOKSHELF.

The Drink Problem of To-day in its Medico-Sociological Aspects. Edited by Dr. T. N. Kelynack. Pp. xii+318. (London: Methuen and Co., Ltd., 1916.) Price 7*s*. 6*d*. net.

THIS book comprises a number of essays by well-known authorities dealing with various aspects of the alcohol question. Dr. Harry Campbell discusses the biology of alcoholism, and asks, What is the nature of the peculiar attraction which alcohol exercises over mankind? He considers that the essential factor is the power to intoxicate and narcotise. Doubtless this is so for the drunkard, but as regards the moderate drinker we do not believe it: it is the flavour, and the flavour alone, and it is noteworthy that no non-alcoholic drink has yet been manufactured which reproduces to any extent the flavour of an alcoholic one. Prof. Woodhead deals with the pathology, and Dr. Claye Shaw with the psychology, of alcoholism, Mrs. Sharlieb with alcoholism in relation to women and children, Sir Thomas Oliver with alcohol and work, and the Rev. J. C. Pringle, of the Charity Organisation Society, with alcohol and poverty. In the last essay Dr. Kelynack, the editor, discusses the arrest of alcoholism, and considers that the most effective work in limiting the worst manifestations of intemperance has been accomplished by the action of the Central Control Board, and certainly the statistics of the decline of drunkenness in London since it has been at work bear this out.

The book is largely a partisan one, but, with this limitation, all the social problems connected with the consumption of alcohol seem to be covered by it. The vexed question of moderate drinking is not altogether burked, and Dr. Claye Shaw admits that in the present war the teetotalers do not appear to have come out of the ordeal better than those who have a preference for alcohol. "Moderate drinking" is an elastic term: we would lay down that the maximum daily consumption of alcoholic drink should not exceed an equivalent of two fluid ounces of absolute alcohol for a weight of ten stones, and that it should be taken in a dilution not stronger than 10 per cent. It is interesting to note that a weighty committee of the French Academy of Medicine has advocated a moderate ration of wine in the French Army on the ground that it replaces a certain amount of meat (protein) and actually diminishes the risk of alcoholism!

Results of Meteorological Observations in the Five Years 1911–1915, *also of Underground Temperatures in the Twelve Years* 1898–1910. *Made at the Radcliffe Observatory, Oxford.* Vol. li. Pp. xv+215. (Oxford: Humphrey Milford, 1916.) Price 15*s*. net.

THE first part of this volume contains daily meteorological data, for the five years 1911 to 1915, in regard to barometric pressure, temperature, wind, cloud, sunshine, rain, ozone, weather notes, and occasional phenomena, according to a plan adopted in previous years. The figures relating to wind are from two instruments of different dimensions, and a detailed comparison would be interesting, as the instruments are at very nearly the same height above ground, though not quite so nearly as the table makes them appear, since the higher one, given at 114 ft. in all the tables, is really at 116 ft. For this comparison, however, we must wait, as it cannot be made from the figures in the volume before us.

In the appendix, which forms the third section

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